by a micrometric screw with a graduated head. My objection to the original construction was that the bright line was photographed on a small piece of glass, and the background was so far from being black as to much impair the spectra of substances that will not transmit a bright light. I suggested that in place of this glass plate a small piece of tin-foil should be used, having a very minute hole in it. This shows far brighter than the line in the photograph, and the back-ground is quite black; and thus the bright dot can easily be seen even when in the brightest part of the spectrum, and there is no extraneous light to impair the faintest absorption-bands The only important objection to this method of measuring their position is, that a very slight movement in the apparatus, due to the loose fitting of moveable parts, alters the readings, and that the value of the measurements, as read off by the micrometer, depends on so many variable particulars, that nearly every instrument might have a different scale. The chief objection to my interference scales[*] is the difficulty of making all agree absolutely, but when accurately made they have not the above-named disadvantages. I therefore still adhere to that plan, but at the same time I have found the bright dot arrangement very useful, not only as an indicator in showing spectra to others, but also as a fixed point in comparing different spectra, or in counting the bands of the interference scale. Possibly without such help some observers might find this difficult, and would prefer in all cases to measure the position of bands by means of the graduations on the circular head of the micrometer, and therefore I was anxious to devise a prism that would have a dispersive power intermediate between the two extremes already mentioned, and at the same time have the upper face inclined at an angle of 45° to the axis, so that the bright dot micrometer might be employed conveniently. To accomplish this, Mr. Browning made for me a prism composed of two rectangulars of crown glass, one rectangular of very dense flint, and one of less dense, cut at such an angle as to give direct vision. This combination gives what I consider to be as good a medium dispersion as could be wished, and at the same time enables us to measure the position of the bands with the bright-dot micrometer as accurately as is requisite in nearly all practical applications. Subsequent trials have shown that the same advantages may be secured in a more satisfactory manner by replacing the less dense flint glass prism by two, one of flint and the other of crown, of such angles as give direct vision for the whole combination of five. The dispersion is very nearly the same as that of two prisms of ordinary flint glass of 60° angle.

I have been thus careful in explaining the advantages and disadvantages of various arrangements, because the successful use of the spectrum-microscope depends so much on such particulars, and because so many who have not had experience in the practical working of the instrument seem anxious to see a wide spectrum, and overlook the practical importance of being able to recognise obscure absorption-bands. My own experience of this question agrees with that of most of my friends who have worked with the instrument, and yet I am quite prepared to believe that a different amount of dispersion might better suit some observers, and to admit the truth of the German saying, "Eines schickt sich nicht für alle."

H. C. SORBY

NOTES

RIPE in years and in honours, his work done and his fame world-wide, amid the regrets of all ranks of his countrymen, Sir Roderick Murchison has gone to his rest. It is nearly a year since he was seized with an illness which disabled him from further active work. Yet in the interval he has shown all his old interest in the affairs of which he has so long been the heart and soul, keeping up his intercourse with the world of science by reading, and with many of his associates by personal interviews at his own residence, and by correspondence. To the last his wonderful memory remained true, even to trifling details of place and date. Within the last few weeks, however, the disease made sad progress, and though he continued to enjoy frequent carriage exercise, his physical strength became less able to withstand any malign effects which the chills of autumn bring with them. On Thursday last he was seized with bronchitis, and gradually sank under the attack, till he died at half-past eight on Sunday evening, the 22nd inst. We shall offer next week a fuller reference to Sir Roderick's life-work and scientific influence. For the present, and ere the earth closes over all of him that is mortal, let us only say that in him Science has lost a hard-working and distinguished cultivator, as well as an influential patron, and that to a narrower circle of mourners his loss is also one of a kindly large-hearted friendship.

WE have to record the death, on Saturday last, at the age of seventy-nine, of Mr. Charles Babbage, the eminent mathematician and mechanician. The most important events of his life, as well as some of the eccentricities of his character, are familiar to the public through his autobiographical volume, "Passages in the Life of a Philosopher." Born in 1792, he entered Trinity College, Cambridge, in 1810, and was transferred to St. Peter's the following year. At his B.A. degree he did not take honours in mathematics, not having specially pursued that subject of study as a student, and was understood to have been disappointed at not being elected a fellow. In 1828 he was however elected Lucasian Professor of Mathematics at Cambridge, a position once held by Sir Isaac Newton. He published no less than eighty volumes, but his claim to public notice rested chiefly on his invention of the Difference Engine, on which he spent immense labour and a large sum of money. Notwithstanding his eccentricities and his failings, Mr. Babbage was a mathematician and an inventor of whom England may be justly proud.

THE English Government Eclipse Expedition sailed this morning for Ceylon in the *Mirzapore* from Southampton, Mr. Lockyer in charge, expecting to reach Point de Galle on Nov. 27. They hope to confer with the Indian observers as soon as possible, and plan a concerted campaign. The experience of the last Expedition necessitated that the whole of the instructions should be rewritten; and the Eclipse Committee of the British Association, consisting of the following gentlemen:—Sir William Thomson, L.L.D., F.R.S., President, Prof. J. C. Adams, D.C.L., F.R.S., G. B. Airy, F.R.S., Astronomer Royal, Prof. Clifton, F.R.S., Warren de la Rue, D.C.L., F.R.S., Dr. Frankland, F.R.S., Captain Douglas Galton, C.B., F.R.S., George Griffith, M.A., J. R. Hind, F.R.S., W. Lassell, F.R.S., President R.A.S., Lord Lindsay, J. Norman Lockyer, F.R.S., General Sir Edward Sabine, K.C.B., President R.S., General Strachey, F.R.S., W. Spottiswoode, LL.D., F.R.S., Colonel Strange, F.R.S., Prof. Stokes, D.C.L., F.R.S., and Dr. Thomas Thomson, F.R.S., have had very hard work to get the arrangements completed, in which they have been most zealously assisted by the Government, and by the Peninsular and Oriental Steam Boat Company. Lord Lindsay placed at the disposal of the Expedition the whole of his valuable instruments, and has sent a photographic observer at his own expense. Several members of the Expedition have voluntarily given up a month of their time before starting to perfect themselves in spectroscopic and other observations at the Royal College of Chemistry, a most commendable example to others in similar situations. We have now only to wish the Expedition a prosperous voyage, and better fortune with regard to weather than was experienced in Sicily last year.

WE have to announce the return of Mr. Gwyn Jeffreys from

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[*] Proc. Roy. Soc., vol. xv. p. 434.

North America. He examined all the principal collections of shells in the United States and Canada, and especially those made in the deep-sea explorations of the Gulf of Florida and Gulf of St. Lawrence. The former was in the charge of Dr. Stimpson at Chicago; and Mr. Jeffreys was entrusted with specimens (some of them unique) of all the species which appeared to him the same as certain undescribed species dredged by him in the depths of the East Atlantic during the *Porcupine* expeditions of 1869 and 1870. These specimens may be the only ones saved from the Museum of the Academy of Sciences at Chicago, which it is greatly feared was destroyed by the late deplorable conflagration. Several species of North American land and fresh-water shells will also be found to inhabit the eastern hemisphere, although bearing different names. Through the kindness of Prof. Baird, Mr. Jeffreys had an opportunity of dredging on the coast of New England in a Government steamer; and he everywhere received great hospitality and attention. He particularly acknowledges his obligation to Mr. Anthony, Prof. Agassiz, and Prof. Shaler, of Cambridge; the Hon. S. Powel, of Newport, R.I.; Prof. Baird, of Washington; Prof. J. C. Draper, of New York; Mr. Binney, of Burlington, N.J.; Dr. Isaac Lea, of Philadelphia; Dr. Stimpson and Mr. Blatchford, of Chicago; and to Principal Dawson and Sir W. E. Logan, of Montreal.

Les Mondes records the death of M. Henri Lecocq, Professor in the Faculty of Sciences at Clermont Ferrand, eminent both as a botanist and geologist. His life has been spent in encouraging and assisting the cultivation of the sciences to which he especially devoted himself; and by his will he has devoted his property to the same end. He leaves to the town where he resided the sum of 150,000 francs, of which 50,000 is bestowed on the botanic garden established by him, 50,000 to the maintenance of water-supply and fountains, and 50,000 to the establishment of covered markets. M. Lecocq leaves besides to the town all his collections of natural history, zoology, botany, geology, and mineralogy, as well as all the cabinets which contained them.

MR. ALFRED HENRY GARROD, scholar in natural science of St. John's College, Cambridge, and formerly Demonstrator in Physiology to Prof. Humphry, has been appointed Prosector to the Zoological Society of London. There is probably no other post in the world which affords opportunities for the study and advancement of animal physiology and comparative anatomy equal to those enjoyed by the possessor of this office, owing to the extraordinary extent of the Society's vivarium in the Regent's Park. Mr. Garrod, we understand, will not enter upon his duties until the beginning of the new year.

MR. DAVIDSON, of King William's College, Isle of Man, has been elected a Scholar in Natural Science at Sidney Sussex College, Cambridge.

A SCHOLARSHIP is announced at Balliol College, Oxford, on the foundation of Miss H. Brakenbury, "for the encouragement of natural science," of the value of 70*l.* for three years. This is open to all candidates who have not exceeded eight terms from matriculation. The examination begins on Tuesday, November 21. Papers will be sent in (1) Mechanics and Physics, (2) Chemistry, (3) Physiology, but no candidate will be expected to take up more than two subjects at the most. There will also be a practical examination in the above subjects. Further information can be obtained from the tutors.

WE understand that the next number of the *Contemporary Review* will contain an important article by Prof. Huxley in comment on some portions of Mr. Mivart's "Genesis of Species."

THE following are among the Publishers' announcements of scientific works for the approaching season:—From Messrs. Longmans:—The Royal Institution, its Founder and its First Professors by Dr. Bence Jones, Hon. Sec.; Spectrum Analysis in its Application to Terrestrial Substances and Physical Constitution of the Heavenly Bodies, familiarly explained by Dr. H. Schellen, with Notes by William Huggins, LL.D., D.C.L., F.R.S, 1 vol. 8vo. with coloured plates and other illustrations; a Smaller Star Atlas, for the use of schools and junior students of Astronomy, by R. A. Proctor, B.A., F.R.A.S., in twelve circular coloured maps and two index maps, with an introduction showing how the stars may be recognised and their motions studied and understood; Popular Lectures on Scientific Subjects, by Prof. Helmholtz, translated by H. Debus; Elements of Materia Medica and Therapeutics, being an abridgement of the late Dr. Pereira's Materia Medica, and comprising all the medicines of the British Pharmacopœia, together with such others as are frequently ordered in prescriptions, and required for the use of medical practitioners, edited by Robert Bentley. From Mr. Murray:—The Principles of Geology, or the Modern Changes of the Earth and its Inhabitants considered as illustrative of Geology, by Sir Charles Lyell, Bart., F.R.S., 11th edition, thoroughly revised, illustrations, Vol. 1; The Metallurgy of Copper, Zinc, and Brass, including Descriptions of Fuel, Wood, Peat, Coal, Charcoal, Coke, Fire-Clays, by John Percy, F.R.S., new edition, revised, many illustrations. From Messrs. Macmillans:—A Treatise on the Origin, Nature, and Varieties of Wine, being a complete manual of Viticulture and Œnology, by J. L. W. Thudichum, M.D., and August Dupré, with numerous illustrations; the Ministry of Nature, by the Rev. Hugh Macmillan; a series of Science Primers, under the joint editorship of Profs. Huxley, Roscoe, and Balfour Stewart; the following will be ready about Christmas: Introduction, by Prof. Huxley; Chemistry, by Prof. Roscoe; Physical Science, by Prof. Balfour Stewart. From Messrs. Bell and Daldy:—Alpine Plants, containing more than one hundred coloured illustrations of the most striking and beautiful Alpine flowers, with descinetions by D. Wooster. From Messrs. Deighton, Bell, and Co:—The Desert of the Exodus, Journeys on Foot in the Wilderness of the Forty Years' Wanderings, by E. H. Palmer, M.A., Fellow of St. John's College, with maps and illustrations from photographs and drawings taken on the spot by the Sinai Survey Expedition, and C. F. Tyrwhitt Drake. From Mr. Goodwin:—A new and greatly-improved edition of What are the Stars? a treatise on Astronomy, by Mary Storey Lyle. From Messrs. Rivingtons:—Elementary Statics, by Hamblin Smith, 3rd edition, revised and corrected; Geometrical Conic Sections, by G. Richardson, M.A., Assistant-Master at Winchester College, and late Fellow of St. John's College, Cambridge; Analytical Geometry of Two Dimensions, by H. E. Oakley, M.A., late Fellow and Senior Mathematical Lecturer of Jesus College, Cambridge, H.M. Inspector of Schools. From Messrs. Cassells:—Elementary Astronomy, by Richard A. Proctor, B.A., F.R.A.S., with nearly fifty original illustrations; Elementary Geography, by Prof. D. T. Ansted, M.A., F.R.S., Examiner in Physical Geography in the Department of Science and Art, illustrated with original diagrams.

WE are glad to learn that the Rev. E. Smith and Mr. Irving are busy with a new and complete flora of the neighbourhood of Nottingham, which we hope will ultimately include the whole of that county. The work is being done under the auspices of the Literary and Philosophical Society of Nottingham.

DR. PETERMANN has written to several German papers to announce the success of a new German Arctic Expedition. According to a telegram received by him a few days ago, and since confirmed, Lieutenants Weyprecht and Payer have penetrated to 79° N. latitude, and have actually discovered the open Arctic Sea, which has been so long searched for. They employed a Norwegian sloop, and penetrated northwards between Spitzbergen and Nova Zembla, and they report an open sea from 42° to 60° E. longitude, and that but little ice was to be seen northward. By these results the anticipations of Dr. Petermann, who long ago recommended an expedition to the North of Spitzbergen, are fully borne out.

THE number of entries at the London Medical Schools is this year unusually large, University College taking the lead with the largest number of fresh entries. We understand that the means of instruction at this admirable school are further enlarged by supplying the only disadvantage at which it has hitherto laboured—a deficiency in the number of beds. In future the students at this institution are to have the privilege of attending the clinical instruction at Middlesex Hospital.

MR. W. R. S. RALSTON is to give the Ilchester Lectures at Oxford this term. They will take place on November 4, 11, and 18, and will be upon Russian Mythology and Folklore.

THE first Evening Lecture at the London Institution, Finsbury Circus, will take place on Thursday, November 2, at half-past seven, the subject being "Michael Faraday: the Story of his Life," by J. H. Gladstone, Ph. D., F.R.S.

THE Council of the Hackney Scientific Association will hold a Conversazione on November 7, at 7.30 P.M., at their Rooms, The Tabernacle, Old Street, N.E.

ON Saturday a meeting of the Senatus Academicus of the University of Edinburgh was held for the purpose of considering what steps should be taken in regard to the admission of the female medical students to the examinations. After a long discussion the Senatus adopted a resolution to the effect that no further difficulties were to be placed in the way of the ladies as regarded either matriculation or preliminary examination.

WE are glad to learn that at Marlborough College 205 boys are studying Science, and about three fourths of these have two lectures a week. Thus since the commencement of the half no form has had more than seven lectures on one subject. The following averages were obtained out of a maximum of 100 marks for each subject:—

Sixths and Upper Fifth—*Chemistry*	65·83
Upper Voluntary (from the three Fifths)—*Chemistry*	55·91
,, ,, ,, *Magnetism*	66·91
Upper Shell Form—*Chemistry*	64·20
Upper Fourth, A— ,, ...	56·28
Upper Fourth, B— ,, ...	56·29
Lower Voluntary (from three preceding)—*Magnetism*	61·85
Modern School: Upper Division—*Chemistry* . .	53·04
,, Middle Division— ,, . .	36·79
,, Lower Division— ,, . .	53·45
,, Upper Division—*Magnetism* .	72·40
,, Middle Division— ,, . .	45·45

MR. HENRY WALKER states, in a letter to the *Daily News*, that interesting relics of the Glacial period are now to be seen at the Finchley Station, on the Highgate and Edgware Railway, on the branch line to Barnet, where the boulder clay is now being revealed in a section of nearly thirty-feet deep. The clay seems to have a maximum thickness of nine feet, and is rich in fossils drifted hither from the liassic, oolitic, and chalk formations of the north. Ammonites and gryphenas are found in great variety and abundance.

PROF. COPE has lately published in the Indianopolis *Journal* an account of a visit to the Wyandotte Cave, and of the animal life occurring within its limits. He reports this cave to be as well worthy the popular favour as the Mammoth Cave of Kentucky, since, although lacking the large bodies of water of the latter, it is fully equal and even superior to it in the number and beauty of its stalactites. The gypsum regions in the more remote parts of the cave are especially beautiful, this substance occurring in amorphous masses of great purity, or in the form of loose crystals resembling snow. Fourteen species of animals were found in this cave, consisting of a blind fish similar to, if not identical with, that of the Mammoth Cave, seven species of insects, two of spiders, one of centipedes, and three crustaceans. Several of these species, as might be imagined, are destitute of eyes, such organs being unnecessary to them in their subterranean abode.

THE discussion in the Indian papers about the Bis-cobra or Bhyscuppra has at length brought out a description. It appears that the name Cobra is misleading, for the animal is a saurian and has nothing to do with the snake, but its supposed poisonous qualities may have furnished the version of Cobra from Cuppra. It is a lizard of no very remarkable appearance; nor does it differ materially in outline from others of its class. Its length is from twelve to twenty inches. It has four feet and an elongated tapering head, in shape not unlike that of the common bloodsucker. It lives on trees, particularly the peepul, and on old tumbledown buildings. It is carnivorous, seeking its prey at night. On provocation it can change its hue from one shade of green to another, but it is not true that it can do more. It is often confounded with the burrowing lizard, which it much resembles, though there is a clear distinction. The latter is a vegetarian, having much longer claws, is different in gait, and cannot change its colour. The natives have a superstitious dread of the Bhyscuppra, but their fears have of late been proved to be unfounded. The creature has no poison in its mouth, nor even fangs. The writer says he has seen a goat bitten by it without unfavourable results, and has heard of other cases.

THE Cundurango is a tree found in Ecuador, the young stems and roots of which are claimed to be a specific cure for cancer and other diseases. A quantity of this was sent by the Government of that country to the State Department in Washington to be experimented upon by some physicians of that city, and the result of the inquiry having been satisfactory, a special expedition was sent out to obtain an increased supply. Much controversy has arisen, however, as to the real virtue of the plant, many physicians denouncing the whole movement as savouring of quackery and humbug. The precise botanical relationships and character of the plant have been until recently unknown; but we now learn from the *Andes*, of Guayaquil, of July 29, in a communication from Dr. Buyon, that it belongs to the order *Eupatoriaceæ*, and species *Mikania guaco* of Endlicher, and that its name of cundurango in the Quichua language means vine of the condor. It is the same plant that is called the guaco in Colombia. According to the tradition of the country, when the condor is bitten by a poisonous serpent it swallows the leaves of the guaco plant, and experiences no harm. In Colombia there are said to be three varieties of the guaco—green, purple, and white—the purple variety being intensely bitter, the white less so and more aromatic, while the green has more astringency. Dr. Bliss, of Washington, is understood to be the great champion of the cundurango, and to have accomplished several notable cures upon prominent personages, and considers it to be as reliable a specific in cancer and scrofula and other blood diseases as cinchona and its alkaloids have proved to be in zymotic diseases. It is quite certain that for many years this plant has been brought forward in tropical America as an invaluable cure for a variety of diseases. As the *Mikania guaco* is found abundantly in South America, it can readily be obtained without going into the interior of Ecuador, should it answer all the expectations of its partisans.

THE total fall of rain in Calcutta to the 31st July was 64·24 inches, the average for 17 years being 37·13 inches. This rain was accompanied by heavy floods and much damage to crops.

COAL is reported as having been found in the Nizam's dominions in the Rajpore and Kummun districts. Attention is now being directed to Beerbhoom, Chota, Nagpore, Rowah, and Bundulcund as a great mineral region.